Short report

Low prevalence of hepatitis B markers among Mexican female sex workers

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Objectives: To estimate the prevalence and associated risk factors of hepatitis B virus (HBV) serological markers in female sex workers (FSW) in Mexico City.
Methods: The study population consisted of 1498 FSW who attended a detection centre for human immunodeficiency virus (HIV) in Mexico City, between January and October 1992. Study participants responded to a standardised questionnaire and provided a blood sample for serology of syphilis, HIV, and HBV.
Results: A total of 0.2% (95% CI 0.1–0.3) of the population were hepatitis B surface antigen (HBsAg) carriers. The general prevalence of antibodies to hepatitis B core antigen (anti-HBc) was 6.3% (95% CI 5.5–7.1). This marker of previous exposition to HBV, was independently associated by logistic regression multivariate analysis with age, working in the street, and history of blood transfusion (BT) before 1987 (OR 4.8, 95% CI 2.1–11.3). Syphilis prevalence was 7.6% (95% CI 6.2–8.9) and HIV prevalence was 0.1% (95% CI 0–0.3).
Conclusions: The prevalence of HBV infection in this group of Mexican FSW is lower than previously reported in other countries. In addition, the frequency of HBsAg carriers is similar to that in the general Mexican population. The absence of two major risk factors for HBV transmission in this group of FSW—that is, injecting drug use and anal intercourse, could help to explain this finding. However, the positive association between anti-HBc and history of blood transfusion demonstrated here, highlights the need to reinforce strict control of blood supplies in Mexico.
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Keywords: hepatitis B; female sex workers; seroprevalence

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Introduction

Several studies have demonstrated that Mexico, together with Canada and the United States, has low hepatitis B endemicity. According to a serological survey carried out in general urban populations throughout Mexico in 1970 the prevalence of hepatitis B surface antigen (HBsAg) was on average 0.29%,[1] and for nationwide unpaid family blood donors during 1990–2 the prevalence of hepatitis B virus (HBV) carriers ranged from 0.2% to 0.8%.[2] In particular, few studies have described the prevalence of HBV markers in high risk groups for sexually transmitted diseases (STD) in Mexico. In a male homosexual group we found 4.8% HBsAg carriers,[3] whereas other authors reported 0.8% in female sex workers (FSW) from the Mexico–US border.[4] The present study describes the prevalence of HBV markers and risk factors associated with HBV infection in a population of FSW who voluntarily attend an HIV/STD information and detection centre in Mexico City.

Material and methods

POPULATION STUDIED

Inclusion criteria for the study population was voluntary attendance at a centre for HIV/STD detection in female sex workers (CONASIDA) between January and October 1992 in Mexico City. No exclusion criteria were applied. This study included 1498 FSW, all of whom answered a questionnaire regarding socioeconomic and demographic characteristics, history of blood transfusion, injecting drug use, and other risk factors associated with STD.

BIOLOGICAL SAMPLE

After obtaining informed consent from each subject, a venous blood sample was taken. Blood samples were sent to the National Institute of Public Health and sera were tested for HBsAg by ELISA (Hepanostika HBsAg, Organon Teknica, Boxtel, Holland). HBV carriers identified through a positive result were retested with the same test for secondary confirmation. Those samples which were confirmed positive were additionally tested using a neutralisation assay provided by the same manufacturer. Prevalence of previous exposure to the virus was assessed using a competitive ELISA test (Hepanostika anti-HBc, Organon, Teknica, Boxtel, Holland) which detects anti-HBc antibodies. If two consecutive tests resulted in an optical density below a "grey area" equal to 66% of the cut off set by the manufacturer, the sample was considered anti-HBc positive. An automatic Biomeck 1000 station (Beckman Instruments, USA) was used to process samples.

All samples were subjected to the rapid plasma reagin (RPR) test (Bigaux Diagnostica, Mexico), and positive sera were confirmed by the fluorescent Treponema antibody (FTA-Abs) assay (Pasteur Diagnostic, Marnes la Coquette, France). Presence of anti-HIV antibody was assayed using an ELISA (RapidELAVIA, Pasteur Diagnostic, Marnes la Coquette, France), and positive results were confirmed by

Table 1 Crude odds ratio of anti-HBc among Mexican female sex workers, by sociodemographic characteristics, sexual behaviour, history of blood transfusion, and syphilis serology during 1993

Variable	*No**	*Prevalence*	*OR*	*95% CI*
Age (years):				
16–22	394	3.3	1.0	
12–27	496	7.3	2.3	1.2–4.6
28–32	313	4.8	1.5	0.6–3.4
33–37	178	10.1	3.3	1.5–7.3
>37	117	11.1	3.7	1.5–8.7
Scholarship:				
High school/college	201	4.9	1.0	
Elementary/junior high school	810	5.8	1.2	0.6–2.5
Illiterate	480	7.9	1.6	0.8–3.6
Marital status:				
Single	719	7.6	1.0	
Widowed/divorced	705	5.5	0.7	0.5–1.1
Married	61	1.6	0.2	0.01–1.4
Number of children:				
>=1	1175	5.7	1.0	
None	308	9.1	1.7	1.0–2.7
Working site:				
Bar	530	4.2	1.0	
Street	816	7.6	1.9	1.1–3.2
Other	152	7.2	1.8	0.8–4.0
Blood transfusion:				
No	1390	5.6	1.0	
Yes	103	16.5	3.3	1.8–6.1
Date of blood transfusion:				
No BT	1390	5.6	1.0	
After 1987	52	9.6	1.8	0.6–4.8
Before 1987	41	24.4	5.4	2.4–12.1
Unknown	10	20.0	4.2	0.6–21.8
Condom use:				
No	233	6.9	1.0	
Yes	1265	6.2	0.9	0.5–1.6
Time working in commercial sex:				
<1 year	271	4.4	1.0	
1–5 years	804	6.1	1.4	0.7–2.8
6–10 years	252	7.5	1.8	0.8–3.9
11–15 years	85	7.1	1.6	0.5–4.9
>15 years	66	12.1	2.9	1.1–8.3
Syphilis serology:				
Negative	1384	5.8	1.0	
Positive	114	12.3	2.3	1.2–4.3

*The number of observations vary because of missing values.

Table 2 Adjusted odds ratio of anti-HBc among Mexican female sex workers, by sociodemographic characteristics, sexual behaviour, history of blood transfusion, and syphilis serology in Mexico City during 1993

Variable	*OR*	*95% CI*	*p Value*
Age (years):			
16–22	1.0		
12–27	2.6	1.3–5.1	0.007
28–32	2.2	0.9–5.1	0.073
33–37	5.4	2.2–13.0	<0.001
>37	5.0	1.7–14.2	0.003
Number of children:			
>=1	1.0		
None	2.4	1.4–4.0	0.001
Working site:			
Bar	1.0		
Street	2.4	1.4–4.3	0.002
Other	2.4	1.0–5.3	0.039
Date of blood transfusion:			
No BT	1.0		
After 1987	2.3	0.8–6.2	0.095
Before 1987	4.8	2.1–11.3	<0.001
Unknown	3.7	0.7–19.9	0.126
Time working in commercial sex:			
<1 year	1.0		
1–5 years	1.2	0.6–2.3	0.623
6–10 years	1.1	0.5–2.4	0.852
11–15 years	0.8	0.3–2.4	0.664
>15 years	1.0	0.3–3.2	0.973
Condom use:			
No	1.0		
Yes	0.8	0.4–1.6	0.563
Syphilis serology:			
Negative	1.0		
Positive	1.9	0.9–3.5	0.058

western blot at the National Institute for Epidemiological Reference, Mexico City.

All women having positive results were counselled and, when necessary, they received medical treatment.

ANALYSIS OF RESULTS

The mean difference in the number of FSW clients per week, categorised by workplace, was assessed by analysis of variance. Risk of HBV infection was estimated using odds ratio (OR) and the aetiological fraction among the exposed population (EFe) was calculated by dividing the absolute effect (due to blood transfusion (BT) precedent) by the OR of exposed individuals (EFe=OR—1/OR).[5] Finally, mutivariate analysis was carried out by logistic regression to identify HBV infection predictors. The purpose of the multivariate analysis was to evaluate variables such as age, level of education, number of children, and frequency of sexual activity as potential confounders for the BT variable.

Results

On average the FSW population was 27.3 years old (range 17–57), and had given birth to 1.6 children, while 4.1% were married. From the population, 28.6% was born in Mexico City while the remainder originated from other states of the Mexican Republic. Street FSW were 54.5%, while 35.4% worked in bars and 10.1% worked in hotels, massage parlours, or brothels. Only one respondent of the total FSW population acknowledged having occasional anal sex with a client and nine reported having occasional anal sex with their partner; none of these two groups tested positive for HBsAg, anti-HBc, or HIV. Moreover, no respondent reported injecting drug use.

The overall prevalence rate for HBsAg was 0.2% (3/1,498, 95% CI 0.1–0.3), 6.3% for anti-HBc antibody (95/1,498, 95% CI 5.1–7.5), 0.1% for anti-HIV antibody (2/1,498, 95% CI 0–0.3), and 7.6% for *T pallidum* antibodies (114/1,498, 95% CI 6.2–8.9).

There was no association between level of education and HBV infection (table 1). Not having children, however, was associated with a higher frequency of HBV infection.

The risk of HBV infection increases significantly with age, although there is no difference in risk of infection with client's condom use. The risk of HBV infection was significantly higher among street FSW compared with those who worked in bars. Women who received blood transfusion before 1987 had also a significant higher risk of HBV infection. The EFe calculation showed that from total cases of positive anti-HBc among 103 transfused women (n=17), 73% (n=12) were significantly associated with the antecedent of BT.

The risk of infection increased with the length of time prostitution had been practised, as well as with positive syphilis serology. The two females positive to HIV had no HBV markers.

Predictors of HBV infection were older age, street working, no parturition, and BT before 1987 (table 2).

Discussion

The prevalence of HBV carriers (HBsAg positive) in this population of FSW from Mexico City was lower than that found in other countries—0.2% *v* 1.7%, 4.6%, or 6.1%.[6–8] However, the prevalence was similar to that previously reported in the general population and in family blood donors in Mexico.[1 2]

Various authors have shown that certain population risk factors such as history of injecting drug use[9–11] and the practice of anal sex by FSWs[12] increase the probability of HBV infection in this segment of the population. Previous publications about Mexican FSWs have revealed a very low injecting drug use ranging from 0.6% to 1%.[4 13 14] In the present study, the low prevalence of hepatitis B markers may be explained partly by the absence of injecting drug use and the infrequent practice of anal sex with clients or regular partners, and the low HBV endemicity in Mexico. However, we have to acknowledge that even though women from our sample denied injecting drug use, there might have been some underreporting of this risk.

Current results which support the hypothesis that HBV is sexually transmitted in FSW include the correlation of exposure periods and workplace with infection. Using the anti-HBc marker the risk of HBV infection increased with age and with the number of years that the subjects had worked as sex workers. In this latter case, the increased risk of infection was not significant following multivariate analysis.

Subjects who worked at street sites and those from "other" workplaces (hotels and brothels) were twice as likely to contract HBV infection than those who worked in bars. This result substantiates conclusions reached in another study which identified that subjects who worked at street sites had consistently higher risk of STD infection than subjects who worked in bars or massage parlours in Mexico City.[13]

The prevalence of anti-HBc in the FSW studied here can be partially explained by their history of BT. Controlled multivariate analysis has demonstrated that subjects with a BT history before the enforcement of HBV testing in Mexican blood banks[15] had an infection risk 4.8 times higher than non-transfused subjects. Historical risk of HBV transmission is probably related to the lack of blood supply control in Mexico before 1987.

Additionally, women with no children had a higher HBV infection risk; however, there is currently insufficient information to substantiate this finding. This study is also a reminder that non-drug injecting sex workers' risk of HBV infection may depend on the community prevalence of the disease.

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